



Designation: E2634 – 18 (Reapproved 2022)

Standard Specification for Flat Wall Insulating Concrete Form (ICF) Systems¹

This standard is issued under the fixed designation E2634; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification is intended to apply to Insulating Concrete Form (ICF) Systems that will act as permanent formwork for cast-in-place reinforced concrete beams; lintels; exterior and interior, above and below grade bearing and non-bearing walls; foundations; and retaining walls. The specification is restricted to ICF Systems with a resultant uniform monolithic concrete core.

1.2 Products covered by the specification consists of molded expanded polystyrene (EPS) insulation panels that are connected by cross ties to form the ICF System.

1.3 This specification identifies test methods appropriate for establishing ICF System performance in their primary function as a stay in place concrete forming system. The use of ICF Systems covered by this specification shall be regulated by building codes that address fire performance, structural performance or both. The fire performance of the material shall be addressed through standard fire test methods established by the appropriate governing documents. The structural performance must be addressed through design of concrete structures in accordance with the appropriate Code requirements.

1.4 Details of manufacturing procedures are beyond the scope of this specification.

1.5 The values stated in SI units are to be regarded as standard. The values given in parentheses are mathematical conversions to inch-pound units that are provided for information only and are not considered standard. For conversion to metric units other than those contained in this specification, refer to **IEEE/ASTM SI 10**.

1.6 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.7 *This international standard was developed in accordance with internationally recognized principles on standard-*

ization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

2. Referenced Documents

2.1 ASTM Standards:²

- C203** Test Methods for Breaking Load and Flexural Properties of Block-Type Thermal Insulation
- C390** Practice for Sampling and Acceptance of Thermal Insulation Lots
- C475/C475M** Specification for Joint Compound and Joint Tape for Finishing Gypsum Board
- C578** Specification for Rigid, Cellular Polystyrene Thermal Insulation
- C645** Specification for Nonstructural Steel Framing Members
- C1002** Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs
- C1363** Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus
- C1396/C1396M** Specification for Gypsum Board
- D635** Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position
- D638** Test Method for Tensile Properties of Plastics
- D732** Test Method for Shear Strength of Plastics by Punch Tool
- D1622/D1622M** Test Method for Apparent Density of Rigid Cellular Plastics
- D1761** Test Methods for Mechanical Fasteners in Wood and Wood-Based Materials
- D1929** Test Method for Determining Ignition Temperature of Plastics
- D2863** Test Method for Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index)
- E8/E8M** Test Methods for Tension Testing of Metallic Materials

¹ This specification is under the jurisdiction of ASTM Committee E06 on Performance of Buildings and is the direct responsibility of Subcommittee E06.21 on Serviceability.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

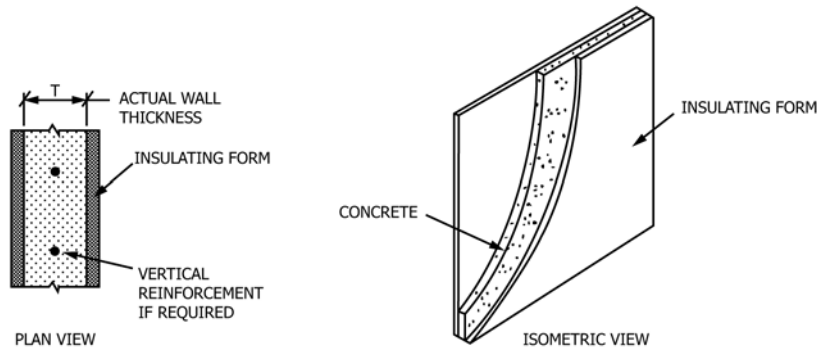


FIG. 1 Flat Wall ICF, Wall Assembly

E84 Test Method for Surface Burning Characteristics of Building Materials

E90 Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements

E119 Test Methods for Fire Tests of Building Construction and Materials

E283 Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen

E331 Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference

IEEE/ASTM SI 10 Standard for Use of the International System of Units (SI): the Modern Metric System

2.2 ISO/IEC Standards:³

ISO/IEC Guide 65 General Requirements for Bodies Operating Product Certification Systems

ISO/IEC Guide 17020 General Criteria for the Operation of Various Types of Bodies Performing Inspection

ISO/IEC Standard 17025 General Requirements for Competence of Test and Calibration Laboratories

2.3 Other Standards:

ACI 318 Building Code Requirements for Structural Concrete⁴

UL 1715 Fire Test of Interior Finish Material⁵

NFPA 286 Method of Fire Test for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth⁶

AISI NAS-01 North American Specification for the Design of Cold-formed Steel Structural Members, including 2005 Supplement⁷

ANSI/ASHRAE 90.1 Energy Standard for Buildings Except Low-Rise Residential Buildings⁸

3. Terminology

3.1 Definitions:

3.1.1 *cross ties*—plastic or metal bridging comprised of flanges and webs that hold the EPS panels at a prescribed distance and provide resistance to the concrete pressure. The flanges may be used as attachment points for interior and exterior finishing materials.

3.1.2 *expanded polystyrene*—a type of foamed plastic formed by the expansion of polystyrene resin beads in a molding process.

3.1.3 *insulating concrete forms (ICFs)*—a structural stay-in-place concrete forming system, consisting of opposing EPS panels, held parallel by means of cross ties and serves to provide insulating characteristics. See Fig. 1.

3.1.4 *quality agency*—a quality agency is defined to be one that: (1) Maintains accreditation as a Certification Organization in accordance with ISO/IEC Guide 65 and as an Inspection Agency in accordance with ISO/IEC Guide 17020. The scope of accreditations shall be consistent with the type of product being inspected. (2) Has access to the facilities and trained technical personnel to verify that the grading, bonding, workmanship, and other characteristics of the products as determined by inspection, sampling, and testing comply with all applicable requirements specified herein. (3) Has procedures to be followed by its personnel in performance of the inspection and testing. (4) Has no financial interest in, or is not financially dependent upon, any single company manufacturing the product being inspected or tested. (5) Is not owned, operated, or controlled by any such company.

3.1.5 *testing laboratory*—a testing laboratory is one that is accredited as complying with ISO/IEC Standard 17025. The scope of the laboratory's accreditation shall include the specific type of testing being performed.

4. Classification

4.1 ICF Systems addressed by this specification are those which produce a cast-in-place uniform monolithic concrete

⁸ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.